

Name _____

Date _____

9.2 Using the n th term — worksheet

Find the n th term of a linear sequence and use it to find any term, or to test whether a number is in the sequence. · 61 questions · Show your working.

Remember

- The **n th term** rule gives any term straight from its **position**, with no stepping.
- $n = 1$ for the first term, $n = 2$ for the second, and so on.
- The **coefficient of n is the common difference**. A gap of 4 means the rule starts $4n$.
- Find the constant by comparing $4n$ with the sequence: what must be added to reach it?
- For a decreasing sequence the coefficient is negative: 20, 17, 14 has rule $-3n + 23$.
- **Always check** by substituting $n = 1, 2, 3$. It takes seconds and catches almost everything.
- To find a term's position, set the rule equal to it and solve.
- If solving gives a fraction, that number is **not** in the sequence — positions must be whole numbers.

A · Fluency — Substitute, and find the rule.

- 1 The n th term of a sequence is $2n + 1$. What is the 1st term?

- 2 The n th term is $2n + 1$. What is the 10th term?

- 3 The n th term of a sequence is $5n - 4$. What is the 1st term?

- 4 The n th term is $5n - 4$. What is the 10th term?

- 5 The n th term of a sequence is $3n + 2$. What is the 1st term?

- 6 The n th term is $3n + 2$. What is the 10th term?

- 7 The n th term of a sequence is $4n - 2$. What is the 1st term?

- 8 The n th term is $4n - 2$. What is the 10th term?

- 9 The n th term of a sequence is $n + 6$. What is the 1st term?

- 10 The n th term is $n + 6$. What is the 10th term?

- 11 The n th term of a sequence is $10n - 6$. What is the 1st term?

- 12 The n th term is $10n - 6$. What is the 10th term?

- 13 The n th term of a sequence is $6n$. What is the 1st term?

- 14 The n th term is $6n$. What is the 10th term?

- 15 The n th term of a sequence is $2n + 8$. What is the 1st term?

- 16 The n th term is $2n + 8$. What is the 10th term?

- 17 The n th term of a sequence is $3n - 3$. What is the 1st term?

- 18 The n th term is $3n - 3$. What is the 10th term?

- 19 The n th term of a sequence is $5n + 3$. What is the 1st term?

- 20 The n th term is $5n + 3$. What is the 10th term?

- 21 The n th term of a sequence is $4n + 8$. What is the 1st term?

- 22 The n th term is $4n + 8$. What is the 10th term?

- 23 The n th term of a sequence is $7n + 2$. What is the 1st term?

- 24 The n th term is $7n + 2$. What is the 10th term?

- 25 Find the n th term of 3, 5, 7, 9, ...

- 26 Find the n th term of 1, 6, 11, 16, ...

- 27 Find the n th term of 5, 8, 11, 14, ...

- 28 Find the n th term of 2, 6, 10, 14, ...

- 29 Find the n th term of 7, 8, 9, 10, ...

- 30 Find the n th term of 4, 14, 24, 34, ...

- 31 Find the n th term of 6, 12, 18, 24, ...

- 32 Find the n th term of 10, 12, 14, 16, ...

- 33 The n th term is $2n + 1$. What is the 20th term?

- 34 The n th term is $5n - 4$. What is the 15th term?

- 35 The n th term is $3n + 2$. What is the 12th term?

36 The n th term is $4n - 2$. What is the 25th term?

37 The n th term is $n + 6$. What is the 50th term?

38 The n th term is $10n - 6$. What is the 30th term?

B · Reasoning — What each part of the rule means.

39 What does the **n th term** rule let you do?

- ☐ Find the next term
- ☐ Find any term straight from its position
- ☐ Find the first term only
- ☐ Count the terms

40 In the n th term rule $4n + 1$, what does the 4 tell you?

- ☐ The first term
- ☐ The common difference
- ☐ The number of terms
- ☐ The last term

41 In the rule $4n + 1$, how do you get the first term?

- ☐ It is 1
- ☐ It is 4
- ☐ Substitute $n = 1$ to get 5
- ☐ It is $4 + 1 + 1$

42 The n th term of a sequence is $5n - 2$. What is the common difference?

- ☐ 5
- ☐ -2
- ☐ 3
- ☐ 2

43 A sequence has common difference 3 and first term 7. What is the n th term?

- ☐ $3n$
- ☐ $3n + 7$
- ☐ $3n + 4$
- ☐ $7n + 3$

44 Why does a decreasing sequence have a negative coefficient of n ?

- ☐ It does not
- ☐ Because the terms go down as the position goes up
- ☐ Because the first term is negative
- ☐ Because of the constant

45 Is $2n + 3$ the same sequence as $3 + 2n$?

- ☐ Yes
- ☐ No

46 Does the n th term rule $4n + 1$ ever give 22?

- ☐ Yes
- ☐ No

- 47 How do you check an n th-term rule you have found?
- ☐ You cannot
 - ☐ Substitute $n = 1, 2, 3$ and compare with the sequence
 - ☐ Look at the last term only
 - ☐ Ask the teacher

C · Challenge — Positions, and what is not a term.

- 48 Find the n th term of 20, 17, 14, 11, ...
- 49 The n th term is $6n - 4$. Which position gives the term 50?
- 50 The n th term is $3n + 7$. Which position gives the term 40?
- 51 Is 100 a term of the sequence with n th term $4n + 2$?
- ☐ Yes
 - ☐ No
- 52 Is 62 a term of the sequence with n th term $4n + 2$?
- ☐ Yes
 - ☐ No
- 53 The 1st term is 8 and the 5th is 28. What is the coefficient of n in the n th-term rule?

D · Word problems — Costs, patterns and growth.

- 54 A taxi costs $2n + 3$ dollars for n kilometres. What does a 12 km trip cost, in dollars?
- 55 A pattern uses $3n + 1$ sticks for n squares. How many sticks for 15 squares?
- 56 A plant's height in cm after n weeks is $4n + 6$. How tall after 9 weeks, in cm?
- 57 A gym charges $5n + 20$ dollars for n months. What is the cost of a year, in dollars?
- 58 A tank holds $500 - 8n$ litres after n days. How much after 20 days, in litres?
- 59 A pattern uses $3n + 1$ sticks. How many squares can be made with 34 sticks?
- 60 A taxi costs $2n + 3$ dollars. How far can you go for 25 dollars, in km?
- 61 Seats in row n number $4n + 8$. Which row has 48 seats?